1855MNRAS..15..185.

would have a motion upwards in the plane of the latitude, whose initial direction (p^1) is the tangent of the arc it would describe.

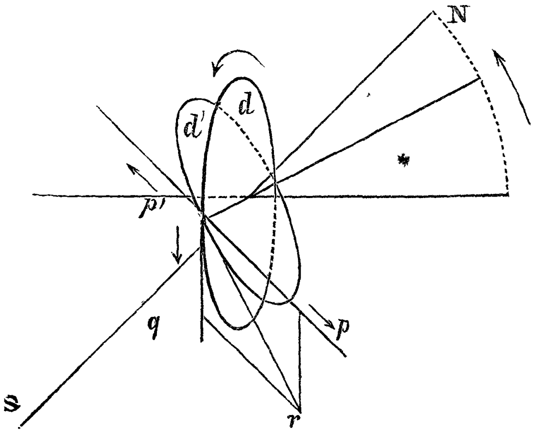

Fig. 3.

But this motion is counteracted by the apparatus giving an equal and opposite reaction downwards (p). This, combined with the rotation (q), gives a resultant (r) between them, in consequence of which the disk (d) takes a new inclination (d'), its axis ascending at the north end, till ultimately it becomes parallel to the axis of the earth, when the rotation of the disk will be in the same direction as that of the earth. If it had been originally rotating in the opposite direction, it is easily seen in the same way that it would come round to the same position.

Report of the Director of the Imperial Observatory of Paris on a Plan for Improving the Organisation of that Establishment.

In accordance with a decree of the Government, the Director of the Imperial Observatory of Paris has recently drawn up a Report on a proposed plan of operations to be pursued at that establishment with the view of placing it on a level with the other Observatories of the first class in Europe. The details of the plan are embodied in a Report recently addressed to the Emperor by M. Fortoul, Secretary of State for the Department of Public Instruction. The contents of this Report, of which the following is the substance, are classed under seven distinct heads.

1. *Meridian Observations.* — Operations of this kind were long imperfectly attended to in France. The first transit instrument was erected at the Paris Observatory only in the year 1800. Since that time foreign establishments have accomplished from year to year considerable progress. In order that the Observatory of Paris may maintain itself on a level with them, it is indispensable that an improvement be effected in the instruments available for that purpose, as well in regard to optical power as in

regard to stability. It will be necessary, besides, to construct a large meridian circle, and to economise the resources presented by dynamical electricity, in order to assure to the observations all the precision of which they are susceptible.

2. *Extrameridional Observations.*— The Observatory of Paris not having yet taken a sufficient part in labours of this kind, it will be necessary to establish an entirely new branch of service, in order to respond to the important interests which are dependent on them.

3. *Comparison of Observations with Theory.*— Observations were formerly published in their rude state, without appending to them the labour of discussion which acquires for them a scientific value. It is not so in the present day: foreign establishments in Europe and America have followed the example given by England twenty-five years ago, and publish only discussed observations.

The Observatory of Paris is one of those which have not yet adopted this improvement. It will be the more difficult to realise it in practice, inasmuch as the ephemerides which have served as the basis of reduction are still in an imperfect state. A plan in reference to this object, based upon eminently scientific principles, is stated to have been proposed by the Director of the Imperial Observatory.

4. *Relations with the Public Service.*— It is extremely desirable that the Observatory of Paris, after having made due provision for the advancement of science, should so dispose its resources as to enable the Government to profit by them. The study of the chronometers of the Imperial Marine might thus be improved, and the same advantage might be accorded to the Mercantile Marine. The different astronomical and meteorological instruments used at sea might also be compared at the Observatory.

The exact time might be sent daily by telegraph to the different parts of the empire, where it is to be obtained at present only imperfectly and for money. On extraordinary occasions it might be desirable to transmit to them atmospheric instructions, which might be necessary for the security of the shipping.

In order to determine with greater accuracy the principal data upon which the map of France has been constructed, it is suggested to unite the resources of the Observatory with those of the Ministry of War. It would be also desirable to transmit the exact time to the principal points of the Metropolis, &c. &c.

5. *Operations connected with Physical Science.*—The progress of astronomy is intimately allied to that of physics, and the latter tends to approximate towards astronomy as well by the services which it renders as those which it receives by borrowing its instruments and methods.

The establishment at the Observatory of a department of physical observations placed under the direction of a *savant* specially appointed for that purpose, is indispensable in the present day, not less for the wants of astronomy than for the solution of the great questions of modern physics. Such an establishment would

1855MNRAS..15..185.

be extremely desirable for maintaining the optical instruments in a high state of efficiency, and for assisting artists in the fabrication of large glasses.

The use of telegraphic apparatuses, the employment of electricity in daily observations, as well as the relations of the observatory with the public service, necessarily demand the attention of a person well acquainted with experimental science.

It would also devolve on the physicist to investigate the advantages which might accrue to the sciences of astronomy and meteorology from the application of photography. Thus the photographic and instantaneous observation of the solar disk, by rendering available a source of light, the extreme intensity of which has hitherto been an object of dread, would assuredly furnish precious materials respecting the physical constitution of the sun.

The vertical has hitherto been considered as fixed, and yet theory indicates that gravity undergoes small variations both in intensity and direction under the influence of the combined attractions of the sun and moon. The investigation of apparatuses capable of indicating this kind of influence, and thereby furnishing new determinations of the masses of the sun and moon, would form an admirable subject of study to the physicist.

Finally, the velocity of light and of electricity has been established in the present day upon the surface of the earth. The same is true in respect to the rotation of the earth, a phenomenon of which the demonstration lately belonged exclusively to astronomy, but is now accessible to physics, which has furnished a proof of its existence that is sensible to all eyes. Still it may be affirmed that the labours undertaken with respect to this object, notwithstanding the just interest which they have excited, are yet only commenced. They might be resumed at the Observatory, receive there the last degree of precision, and thus be made to furnish important data for a knowledge of the solar system. This section concludes wlth recommending M. Leon Foucault to the office of Physicist to the Observatory.

6. *Meteorological Operations.*— It is also to the Physicist of the Observatory that the direction of the meteorological operations would belong, and this is not the least important part of the labours intrusted to him.

The establishment of model instruments, and of self-operating instruments; researches on the temperature of the air; on hygrometry, on pluviometry, on winds, on atmospheric electricity, on terrestrial magnetism, on atmospheric phenomena, such as halos, auroræ boreales, &c.: all this branch of meteorological observations is still to be created at the Observatory of Paris.

Even although confined to a single station, these studies would be of great utility. They would offer still greater interest if it were possible to extend them over the whole surface of the earth, and to trace across continents and seas the propagation of great atmospheric waves. It would be necessary for this purpose to

1855MNRAS..15..185.

collect together the materials established at a great number of stations, and to institute a comparison between them. The electric telegraph promises in the present day to accomplish this important work with the most complete success.

7. *Scientific Administration.*—This section includes theoretical instruction, and also practical instruction in the art of observation, the care of publications and the charge of a vast and growing correspondence. In order to assure the improvement of these different departments it would be desirable to increase the salaries of the officials of the Observatory who are not remunerated in proportion to the difficulty and importance of their labours.

By an Imperial decree subsequently issued, the situation of Physicist of the Observatory has been instituted, and M. Leon Foucault has been appointed to this new office. The salaries of the astronomers connected with the Observatory have also been increased in pursuance of the same decree.

ERRATUM.

Page 161, line 3 from bottom, *for* agreement, *read* argument.

CONTENTS.

Page
Fellows elected 173
Discovery of a new Planet, by M. Chacornac 173
Elements of Chacornac's Planet, by M. Lesser 173
Discovery of a new Planet, by M. Luther 174
Discovery of a new Comet, by M. Schweizer 174
On a Method of Observing the Spots of the Sun, by Mr. Carrington ... 174
Remarks on the Orbits of α *Centauri* and σ *Coronæ Borealis*, by Capt. W. S. Jacob 178
Description of an Observatory erected at Grantham, by Mr. Jeans ... 181
On the Theory of M. Foucault's Gyroscope Experiments, by the Rev. Baden Powell 182
Report on a Plan for Improving the Organisation of the Observatory of Paris 185

London:—Printed by G. Barclay, Castle St. Leicester Sq.